



AMU DARYA BASIN  
NETWORK

POLICY BRIEF

**DEVELOPING  
INTEGRATED  
WATER-MANAGEMENT  
CAPACITIES AND  
EMPOWERING  
LOCAL EXPERTS**

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# DEVELOPING INTEGRATED WATER-MANAGEMENT CAPACITIES AND EMPOWERING LOCAL EXPERTS

## THE AMU DARYA BASIN NETWORK

### INTRODUCTION

The Amu Darya Basin, home to 43 million people of Afghanistan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, is facing a lack of sustained capacity in the water management sector. That is, these countries do not have enough qualified personnel, modern equipment for data collection and analysis, and reliable information-management systems. In addition, their research institutions and universities rarely undertake interdisciplinary approaches towards water management. Without these capacities, the region cannot cooperate effectively on sharing a precious resource: the waters of Central Asia's largest river. To create an integrated water management system in the Amu Darya Basin, the region must build these capacities on a local and national level.

*"The river looks at the talent and ability of all sides and then apportions them their due share,"*

Gul Pacha Ulfat,  
Afghan writer  
and poet

Today's capacity deficit is rooted in:

- *Brain drain:* All too often, qualified water management sector employees leave local government institutions, research institutes and universities due to lack of job opportunities and career advancement;
- *A lack of regional and national development strategies for capacity building:* Existing capacity-development projects are short term and do not feed into a larger scale plan for creation of skilled expertise in the water sector. Capacity building activities are not based on scientific knowledge of what kind of expertise and how many is needed in a particular field in the water sector.

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This policy brief outlines aspects of capacity development that require urgent attention. It aims to assist donors and basin country governments by outlining key actions. It is the result of in-depth discussions and the collaborative work of the Amu Darya Basin Network, a hub of over 40 experts, researchers, development practitioners, and policymakers from the basin countries and Europe, who share a keen interest in better managing water resources in the Amu Darya Basin<sup>1</sup>.

<sup>1</sup> For more information and for obtaining summaries of the conference calls that discussed topics of this policy brief, refer to the website of Amu Darya Basin Network ([www.amudaryabasin.net](http://www.amudaryabasin.net)).

## KEY MESSAGES AND RECOMMENDATIONS:

- *Targeted Training:* Capacity has to be built from junior research and management positions up to the higher levels of political and technical decision-making in water sector. Without qualified personnel, it will be difficult to achieve the kind of effective water management needed to fully develop water resources of the basin. Particular emphasis should be placed on recruiting and educating post-graduate level and research staff in the scientific and academic institutions that deal with water management.
- *Exchanges:* Equally important encouraging and actively promoting mobility among Central Asian and Afghan experts, researchers and students through suitable exchange programs, unified curriculum standards, and strengthened e-mobility.
- *Career Incentives:* To reduce the "brain drain" in the basin, governments and other stakeholders must create an enabling environment that allows young professionals and researchers to build a career in their countries' national water sectors. Specific steps that can be taken are improving working conditions in research and government institutions, increasing the number of job opportunities with lucrative salaries and creating other economic incentives.

## DEFINING CAPACITY DEVELOPMENT

Before entering our main discussion on capacity development in the Amu Darya Basin, this section gives some important concepts and definitions regarding capacity development.

In this paper, capacity development is defined as "the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time" (UNDP, 2008). This definition recognizes the *local ownership* of capacity development process and that, rather from starting from a blank slate, these countries have *existing national capacities* that need to be strengthened. For example, water management institutions in Central Asian countries already have experienced staff with very good technical knowledge and skills in water management. As defined here, international organizations and donors can offer assistance, but the beneficiaries themselves can and should perform the necessary tasks and solve problems little outside guidance. Still, knowledge should be created collaboratively in this process (Fukuda et. al, 2002).

As this paper looks at capacity development with the aim to improve integrated water-resources management in the basin, the discussion will focus on the availability of human and technical resources in the higher education and research institutions that deal with water management.

## EDUCATION AND TRAINING DEFICITS AND IMPACTS

### 1) Technical emphasis of curricula

Currently, specialized training in water management in the Amu Darya river-basin-sharing countries covers mainly technical and engineering subjects, such as: hydrology, irrigation and drainage systems; hydraulic engineering structures; hydropower and pumping stations; and engineering design. Such curriculum result in knowledgeable technical approaches to water management, but fail to produce approaches that take into account the complexity and broader issues of integrated water management and trans-boundary water sharing. The technical approach excludes the legal, economic, environmental,

and political aspects of water management. Therefore, the curriculum in universities should be broadened to include important interdisciplinary subjects, such as integrated water management, law, and legal aspects of water management as they relate to natural resources management.

## 2) Need for legal capacity

To implement trans-boundary water governance, states must apply and implement international and regional agreements inter alia to allocate shares of available water resources and to regulate disputes. Over the past two decades, Amu Darya River-sharing countries have become part of international treaties, adopted a number of regional and sub-regional agreements, and established new regional institutions. But so far, governments of basin countries mostly fail to comply with these and other existing international and regional agreements on water.

Why? Basin countries have a substantial lack of legal expertise and are often unable to effectively negotiate with each other, let alone implement complex legal instruments. They have few lawyers or experts with substantial knowledge of international treaty law. **Without modernizing and enhancing of existing regional and bilateral legal frameworks of cooperation, it will not be possible for these states to effectively manage shared water resources. To fully realize the potential of legal instruments for more effective water management at national and basin levels, these states must enhance their capacities in understanding, monitoring, evaluating and implementing legal instruments is necessary. Educating lawyers and experts in this kind of international law must therefore be a genuine part of water management education and training.**

## 3) Lack of basin-wide education approaches

Under the Soviet Union, a holistic approach to water issues of the Amu Darya Basin was in place, as today's independent basin were under the umbrella of the central government in Moscow. While central planning in Soviet times had its downsides, it did ensure a unified and less-fragmented planning around available water resources.

After the disintegration of the Soviet Union, the newly-independent Central Asian states started pursuing their national development goals individually. This led to the fragmentation of the previously centralized system for water-resources development in the basin. It also negatively influenced common attitudes towards basin-wide education and training strategies. Today, these countries' students and researchers have little opportunity for mobility, or for intellectual and scientific exchange. As many water-management issues in the basin call for a regional approach, states must incorporate regional elements into education and capacity-building efforts, and counter the resistance to cooperative approaches that has developed in the past twenty years.

Currently, there are very few training centers with regional perspectives (Box A). Regional training initiatives, common curricula planning and student exchanges are either not in place or exist in only a very rudimentary manner. This prevents the development of basin-wide approaches to water management and common understanding of related issues. Regional exchange among students and researchers would, however, be an important step toward achieving cooperation and effective management of water resources in the basin. Member countries and donors should make efforts to strengthen, build on and develop existing programs and mechanisms.

**BOX A. Existing Regional Capacity-Development Initiatives**

**The Training Center of Interstate Commission for Water Coordination (ICWC)** aims to increase the capacity of ICWC staff through delivering water management training programs in all the five Central Asian countries.

**The University of Central Asia (UCA)**, established by the governments of Kazakhstan, Kyrgyzstan, Tajikistan and the Aga-Khan Foundation, provides BSc and MSc degrees and prepares future experts in key development fields that respond to local, national and regional needs. UCA also provides practical training to existing professionals, youth and adults in various fields.

There are a number of other bilateral initiatives between foreign and local universities. An example of one of these programs includes **German-Kazakh University** that has recently started an interdisciplinary program in Integrated Water Resources Management.

**4) Lack of career development perspectives**

Unfortunately, more comprehensive education and training alone will not solve the water problems in Central Asia and Afghanistan. These training initiatives must be sustainable and have a practical impact. They must give individuals a long-term perspective and motivation to stay engaged in water management. In order to put knowledge into practice, trained water experts have to acquire jobs in water administration and scientific institutions. However, experience shows that good qualified water experts often leave state water agencies and academic institutes for better paid jobs at donor agencies or international NGOs. There is indeed a “brain drain” from state to donor agencies that causes loss of professional capacity.

This brain drain is certainly more complex than when experts leave their home countries and does have some positive effects: those experts still work for their country and guarantee that donor-funded international projects (e.g. irrigation rehabilitation, water supply and sanitation) include national expertise. Yet, in international projects, national professionals are seldom involved in the development of projects but rather consigned to their implementation. In addition, those projects are generally perceived as “foreign” and therefore are characterized by a lack of ownership, low feedback, and limited learning effects for the state agencies.

Therefore, governments must seek to create attractive working environments and focus on career development for young professionals and highly qualified experts in water science and administration. While these possibilities might be limited, governments could begin by learning from existing initiatives such as the “Returning Experts” program of the German Federal Ministry for Economic Cooperation and Development or similar programs that support reintegration of young academics into their home countries.

**OTHER RELATED DEFICITS IN CAPACITY DEVELOPMENT****5) Data and information management**

So far, capacity development has been discussed from the point of view of improving education and training. In integrated water management, capacity-development activities also refer to creating and improving reliable data and information management systems. Without sufficient data on climate, water flow, water quality and quantity, the capacities of riparian countries to deal with issues of climate change, floods, droughts and other natural hazards will remain low. As reported in the Afghanistan Human Development Report (2011), lack of reliable data is a major barrier to water resource development and management in Afghanistan. In other riparian countries in the Amu Darya Basin, the

data and information management systems are also in a state of obsolescence, with the exception of a few installed data acquisition and management systems (Box B). This prevents states from producing highly accurate and reliable data, as well as timely access to that data.

Although there are many ongoing projects by donor and international organizations (like the World Bank, Swiss Development Cooperation, UNECE, and others) to improve existing hydrological and meteorological data-and-information-forecasting systems in the basin, more attention should be paid to data standardization and establishing a regional database that is reliable and open to public. Such databases can help to create a common framework for integrated water management principles, prepare the ground and build trust for negotiating agreements, assess regional costs and benefit schemes, and considerably improve the use and exchange of basin information. However, this may take time. For example, the Central Asia Regional Water Information Base (CAREWIB) Project, which serves as a perfect example of such a database, was launched in 2003 and is still in the process of being implemented. Much was carried out during this period: an online portal was developed to make data more accessible, data collection systems were enhanced and some national information systems were established. However, there is still much to be done, such as coordinating different sectors within a country and encouraging joint data-sharing between countries.

#### **BOX B: Data Acquisition and Control Management Systems**

Currently, the Supervisory Control and Data Acquisition (SCADA) is used for data acquisition, control and management. It collects data from various sensors in remote river locations and sends this data to a central computer. SCADA allows control and management of the headwork of canals that supply water to irrigated lands, and provides automatic regulation of water level and discharge in water systems. The system has been in operation since the late 1990s and has enabled huge amounts of water savings.

The main functions of SCADA system are:

- remote measurement of water and salinity levels;
- continuous collection, storage and processing of measurement data on computers in headwork and dispatch office;
- automatic regulation of water level and discharge on water structures;
- remote (up to 50 km) and manual regulation of gates from dispatch office and headwork;
- remote exposure and elimination of SCADA and water structures breakages.

The main advantages of the system are as follows:

- measurement accuracy;
- improved information database, enhanced efficiency, and improved access to data due to timely and continuous flow of data;
- water savings as a result of accurate measurements.

*Source: SIC ICWC*

## **6) Lack of local research capacity**

Currently, research capacity in the Amu Darya Basin, an important element of overall nation's capacity, is very limited and needs to be enhanced. Research institutes lack modern equipment and research technologies due to limited funding from national governments. They also lack new research projects, and innovative approaches and methodologies for addressing major issues such as productivity of land and water, climate change, and the relation between water and energy – all of which will certainly require more analysis, research, modeling, scenario development, and application studies.

The attention paid to research is indeed limited in the basin, particularly in the higher education system. In fact, far from being a mainstream activity in universities, research represents only a small fraction of academic activities. This can be attributed to the fact that universities are burdened by many tasks, including much administrative work, and struggle to support research.

Lack of research also results in limited research productivity and dissemination of research results through publications. Overall, the number of publications by Afghan and Central Asian scientists in international journals is low, in part due to limited knowledge of English and difficulties in meeting high standards for international peer-reviewed publications. Without building new information networks, dialogues and exchanges within and outside the basin, any large initiative's sustainability and adoption will remain in question. There is a strong need to bridge the gap by **initiating collaborative international and basin-wide research, and increasing the mobility of researchers to enable them to interact with each other and their peers world-wide. This would allow them to conduct basin-wide studies, and generate new knowledge and capacity for enhanced basin-wide integrated policy planning and decision making.**

Furthermore, **it is important to bridge the gap between research, development and policy application. A continued gap may lead to uninformed and ineffective policies.** Building capacities of experts and decision-makers on all levels is crucial, as is clearly shown by today's problematic debate on hydropower and irrigated agriculture. These problems urgently require enhanced capacity in supportive disciplines like water governance and law, economy, agronomy and energy economics.

## SUMMATION: CAPACITY DEVELOPMENT STRATEGIES AND POLICIES TO IMPROVE TRANSBOUNDARY WATER COOPERATION

### CREATE AN ENABLING ENVIRONMENT FOR INCREASING PROFESSIONAL CAPACITIES

In order to develop professional capacity in Amu Darya Basin countries' water sectors, **it is important to avoid brain drain. How? Governments, businesses and international donors must work to create an enabling environment that allows young professionals, researchers and scientists to build a career in their country's national water sectors.** Specific steps that can be taken are improving working conditions in research and government institutions and creating more job opportunities with lucrative salaries. The role of governments, businesses, and international donor community is crucial in this effort.

### POLICY FORMULATION AND STRATEGIC PLANNING

**Governments should establish regional and national development strategies for enhancing local capacities** based on professionally implemented needs-assessment surveys or market studies. These studies should seek to identify actual key capacity needs and gaps in local expertise regarding transboundary water management and water governance. These assessments can help guide the activities and efforts of development actors and international organizations that contribute to long-term impact. It is also important to develop strategies where existing capacity development projects feed into a larger regional vision and plan.

## ENHANCED AND INTEGRATED CURRICULUM

The water-related curriculum currently taught in universities must be expanded to include important subjects such as sustainable land and water management, sustainable energy production and management, international and national law as it relates to natural resources management, integrated water resources management, water governance and economics. For this, universities that specialize in water management could develop partnerships with universities that specialize in law, energy or other relevant subjects. At the same time, local universities could partner with international universities to learn how to integrate new subjects into the curriculum.

## REGIONAL SOLUTIONS

A basin-wide effort is needed to improve interstate exchange, knowledge and mobility among Central Asian, and between Afghan and Central Asian, students, researchers, and experts. What might this look like? One step could be setting up of networks consisting of people with shared professional interests. These networks can be a powerful way of sharing knowledge and experience. For example, the Amu Darya Basin Network is a network where scientists and practitioners learn about and collaborate on water management problems. Similar networks with attention on water leadership could be initiated to link young professionals, experts and researchers.

In the long term, to secure and further enhance transboundary cooperation, it is critical that the **future generation of specialists is educated to cooperate and jointly search for solutions**. A first step to joint solutions could be creating joint water-related programs with a focus on regional cooperation. Examples can be drawn from European exchange programs like Erasmus Mundus, through which international and European students learn at partner universities. Similar educational programs could be initiated to train local students in the basin, and to get students from abroad and from other basin countries to interact with local students. Together, these students could conduct research in ongoing projects, both within academia and local water-management organizations. Donors would play a crucial role in coordinating of research organizations, relevant agencies, universities and donors.

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Possible policy interventions for empowerment and creation of excellence

	Education	Water	Data	Environment	Agriculture	Energy	Economy
International	Encourage trainings, and mobility programs to Europe	<p>Policies that encourage developing strategic vision in relation to capacity development</p> <p>Adopt policies that promote integration and efficiency across the water, agricultural, and energy sectors</p>	<p>Encourage capacity development projects to increase data collection, transfer, analysis and storage</p> <p>Encourage building of joint data gathering stations and data standardization</p>	Encourage programs to raise awareness on the importance of environment (environmental risks, impacts of non-efficient and unsustainable uses of water and energy resources, pollution, positive impacts of ecological integrity of basin, climate change mitigation and adaptation)	<p>Funding of projects that encourage innovative approaches to agricultural development</p> <p>Support capacity development projects and promote best practices</p>	Enhancing capacities to generate alternative energy supplies, including wind and solar	-Encourage economic incentives to prevent brain drain from Universities and research institutes
National	<p>Review of national education policies</p> <p>Encourage needs assessment studies to improve national water-related programs of study and research</p> <p>Encourage trainings, and mobility programs to Europe, and interstate mobility programs between the riparian countries</p>	<p>Encourage the development of strategic vision in relation to capacity development</p> <p>Integrated and joint studies to transboundary water management</p>	<p>Encourage capacity development projects to increase data collection, transfer, analysis and storage</p> <p>Encourage building of joint data gathering stations and data standardization</p>	Encourage programs to raise awareness on the importance of environment (environmental risks, impacts of non-efficient and unsustainable uses of water and energy resources, pollution, positive impacts of ecological integrity of basin, climate change mitigation and adaptation)	<p>Funding of projects that encourage innovative approaches to agricultural development</p> <p>Support capacity development projects and promote best practices</p>	Enhancing capacities to generate alternative energy supplies, including wind and solar	-Encourage economic incentives to prevent brain drain from Universities and research institutes

<p><b>Regional/Basin-wide</b></p>	<p>Encourage needs assessment studies to improve national water-related programs of study and research</p> <p>Encourage trainings, and mobility programs to Europe, and interstate mobility programs between the riparian countries</p>	<p>Encourage the development of strategic vision in relation to capacity development- Integrated and joint studies to transboundary water management</p>	<p>Encourage capacity development projects to increase data collection, transfer, analysis and storage</p> <p>Encourage building of joint data gathering stations and data standardization</p>	<p>Encourage programs to raise awareness on the importance of environment (environmental risks, impacts of non-efficient and unsustainable uses of water and energy resources, pollution, positive impacts of ecological integrity of basin, climate change mitigation and adaptation)</p>	<p>Funding of projects that encourage innovative approaches to agricultural developmentSupport capacity development projects and promote best practices</p>	<p>Regional study on dam safety and using dams to achieve both equitable electricity generation and timely and sufficient water for agriculture</p>	<p>-Encourage economic incentives to prevent brain drain from Universities and research institutes</p>
<p><b>Local/Community</b></p>	<p>Encourage inter-generational sharing of knowledge and skills between established and emerging water leaders</p>	<p>Hold local consultations on basin vision to inform national and regional policies</p>	<p>Identify specific water managers to participate in data collection trainings</p>	<p>Encourage programs to raise awareness on the importance of environment (environmental risks, impacts of non-efficient and unsustainable uses of water and energy resources, pollution, positive impacts of ecological integrity of basin, climate change mitigation and adaptation)</p>	<p>Learn about water-saving measures used by farmers and water users; raise awareness of the farmers and water users on efficient ways of water use</p>	<p>Raise awareness of the local communities on efficient use of energy resources (electricity)</p>	<p>-Conduct survey in Universities and research institutions to help understand what kinds of incentives would attract professors and researchers to remain in Central Asia and Afghanistan</p>